AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Currently amended) A method of detecting a windshear condition in ~~an~~ a remote atmosphere in front of an aircraft, the method comprising the steps of:

(a) projecting a series of optical pulses into ~~an~~ a remote atmosphere ahead of the aircraft;

(b) detecting a series of reflected optical responses from the remote atmosphere corresponding to reflections from at least two predetermined different distances in front of the aircraft greater than 200 meters away from the aircraft;

(c) processing said reflected responses from the remote atmosphere to determine a current relative wind speed at said predetermined distances in front of said aircraft;

(d) processing said current relative wind speeds to determine if a wind profile indicating a windshear condition exists in front of said aircraft ~~in airspace~~ in the vicinity of the predetermined different distances.

2. (Currently amended) A method as claimed in claim 1 wherein said step (c) includes the step of:

utilising a global positioning system to determine a current position and the frequency shift of said reflected optical ~~pulse~~ pulses to determine the current relative wind ~~speed~~ speeds at said predetermined ~~distance~~ different distances in front of said aircraft.

3. (Previously amended) A method as claimed in claim 1 wherein said optical pulses are derived from a single laser device having a small wavelength range.

4. (Original) A method as claimed in claim 1 wherein said step (c) includes the step of:

determining the Doppler shift in the reflected response utilising a differential Mach-Zehnder Interferometer.

5. (Original) A method as claimed in claim 1 wherein said step (c) includes the step of:

storing each of said current relative windspeed for each of said predetermined distances.

6. (Original) A method as claimed in claim 1 wherein said method is repeated at regular time intervals of less than 10 seconds.

7. (Original) A method as claimed in claim 1 wherein said predetermined distances include a range from substantially 0.2 kilometres to 4.0 kilometres in front of the aircraft.

8. (Previously amended) A detection system for detecting the presence of windshear in front of an aircraft, said system comprising:

a laser for transmitting a first portion of a series of optical pulses in front of said aircraft;

a receiver for detecting back scattered light from said transmitted optical pulses;

delay means for delaying a second portion of said series of optical pulses for a time period substantially corresponding to the time of flight of said back scattered light;

first comparison means for comparing said delayed second portion with said back scattered light so as to determine the Doppler shift of the back scattered light and a wind velocity and direction, relative to said aircraft at a series of distances corresponding to said time of flight of each pulse; and

second comparison means for comparing the wind velocity at said series of distances to determine whether a windshear event is present in the vicinity of the back scattering of said backscattered light.

9. (Previously amended) A system as claimed in claim 8 wherein said first comparison means includes a Dual Differential Mach-Zehnder interferometer to indicate

the frequency difference and positioning between two light beams, said interferometer comprising:

a First Mach-Zehnder interferometer incorporating a delay in one arm;

a Second Mach-Zehnder interferometer incorporating a different delay in one arm;

a means of determining the detected output of the First Mach-Zehnder interferometer to indicate the doppler shift in a first light beam; and

a means of determining the output of the Second Mach-Zehnder interferometer to indicate a wind velocity at a reflected distance from said aircraft.

10. (Previously amended) A Detection System to predict the presence of windshear along the flight path of an aircraft during the critical landing and take off phase comprising:

high powered solid state laser for transmitting a light beam;

receiver to capture a second back scattered light beam from the first beam;

a means to provide a third light beam as a sample of the first beam;

solid state module to delay said third beam for a time corresponding to the transit time of the second light beam and the first light beam;

solid state detector to detect a differential response of the second light beam to the response of third light beam, said differential response corresponding to a wind velocity measurement in the vicinity of the backscattering of said second backscattered light beam; and

solid state computer to record and store wind velocity measurement.

11. (Currently amended) A method of detecting current wind velocity at predetermined different distances exceeding 200 meters from an aircraft along a flight path of the aircraft and determining when differences in the detected wind velocities exceed a predetermined amount, the method comprising the steps of:

(a) projecting a series of optical pulses into an atmosphere ahead of the aircraft;

(b) detecting a series of reflected optical responses from at least two positions in the atmosphere corresponding to reflections from the predetermined distances in front of the aircraft;

(c) processing said series of reflected optical responses to determine a current relative wind speed at said predetermined distances in front of said aircraft; and

(d) processing said current relative wind speeds to determine if alteration in the wind velocity exceeds said predetermined limit in front of said aircraft in the region of said reflections.

12. (Previously amended) A detection system for detecting the presence of differences in wind velocity at a series of distances in front of an aircraft, said system comprising:

a laser for transmitting a first portion of a series of optical pulses in front of said aircraft;

a receiver for detecting back scattered light from said transmitted optical pulses;

delay means for delaying a second portion of said series of optical pulses for a time period substantially corresponding to the time of flight of said back scattered light; and

first comparison means for comparing said delayed second portion with said back scattered light so as to determine a wind velocity and direction, relative to said aircraft at a series of distances corresponding to said time of flight of each pulse; and

second comparison means for comparing the wind velocity at said series of distances to determine if differences in wind velocity exceed said predetermined amount in the vicinity of the backscattering of said back scattered light.

13. (Previously amended) A detection system to predict the presence of spatial alterations in wind velocity exceeding a predetermined amount along the flight path of an aircraft during the critical landing and take off phase comprising:

high powered solid state laser for transmitting a light beam;

receiver to capture a second back scattered light beam from the first beam;

a means to provide a third light beam as a sample of the first beam;

solid state module to delay said third beam for a time corresponding to the transit time of the second light beam and the first light beam;

solid state detector to detect a differential response of the second light beam to the response of third light beam; and

solid state computer to record and store a wind velocity measurement.

14. (New) A method of detecting windshear in front of an aircraft, the method comprising the steps of:

(a) transmitting a first portion of each of a series of optical pulses in front of the aircraft;

(b) receiving and detecting back scattered light from the backscattering of said optical pulses in the atmosphere in front of the aircraft;

(c) delaying a second portion of each of said series of optical pulses for a time period substantially corresponding to the time of flight of said back scattered light;

(d) comparing the second delayed portion of said optical pulse with the received portion of the optical pulse to determine the Doppler shift of the back scattered light and a wind velocity and direction, relative to said aircraft at a series of distances corresponding to the time of flight of each pulse; and

(e) comparing the measured wind velocity at the series of distances to determine whether a windshear event is present in the vicinity of the back scattering of said backscattered light.